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NOTES ON SYSTEMA.

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This paper presents the results of a study of two groups of vittate species of *Systema*, (1) the more or less closely allied species that have gone under the name of *Systema taeniata* (Say) since Horn's revision of the genus in 1889, and (2) the very closely related species belonging to a widespread group of which *S. elongata* (Fabr.) is a well-known representative in the United States. Drawings are given of the Le Conte and Melsheimer types of the species concerned and of a cotype of Boheman's *S. pallidula*. In addition, descriptions are included of three new species based on material hitherto referred to *S. taeniata* in the National Museum and other collections, and of a new Central American species which is closely related. Except for a small collection of *Systema* from the Illinois State Natural History Survey and a few specimens, chiefly types, from the Museum of Comparative Zoology, this study is of specimens in the National Museum. My thanks are due the authorities in charge of these collections for the opportunity to study this material.

GROUP I.

Systema taeniata (Say).

Altica taeniata Say, Long's Second Expedition, p. 294, 1824.

Systema taeniata Horn, Trans. Amer. Ent. Soc., vol. 16, pp. 272, 318, 1889.

Say described *Altica taeniata* as "black; antennae, feet, and vitta on the elytra, white. Inhabits North-west Territory. Body deep black, polished; head with rather distant, profound punctures; region of the antennae a little elevated and dull rufous; antennae pale, dusky at base and tip; thorax punctured; punctures rather large and profound, but not very dense; no impressed line; posterior angles with minute abrupt excurvature, acute; elytra punctured

like thorax, with a longitudinal white vitta on the middle of each, commencing at the middle of the base and extending rectilinearly, with a slight degree of attenuation to near the tip and occupying about the sixth part of the surface; feet pale, posterior thighs dusky towards the tip. Length three-twentieths of an inch. This species resembles *A. striolata* Schöenh. (which seems to be *Crioceris vittata* and *Galleruca elongata* of Fabr. . . .) but it is larger, of a more elongated form, and the vitta of the elytra is not flexuous as in that common and profusely named insect. I have not met with it in the Atlantic States."

The type of Say's species, unfortunately, is lost. Horn, who first placed *taeniata*¹ in the genus *Systema*, stated that he did so on account of Say's description of the thorax as having "prominent or excurved hind angles" and because of "his mention of *G. elongata* in the description."² In his table of species (p. 318), Horn synonymized with *taeniata* Le Conte's species *ligata*, *ochracea*, *mitis*, and *bitaeniata*, and Melsheimer's species *blanda*, the types of all of which are in existence in the Museum of Comparative Zoology at Cambridge, Mass., and also *S. pallidula* Boh., which is in the Stockholm Museum. In his discussion of *taeniata*, Horn recognized as intergrading varieties Le Conte's species *ligata*, *ochracea*, and *mitis*, and Melsheimer's *blanda*, but he did not discuss at all the species *bitaeniata* or *pallidula*. The types of all of these except *pallidula* have been examined, and not one of them agrees in every respect with Say's description of *taeniata*. In fact, the writer has been unable to find a species of *Systema* that does entirely fit *A. taeniata* as described by Say. Since Say's type of *taeniata* is no longer in existence, and since his description cannot be applied with certainty to any one of the four species here distinguished in the material that has hitherto been called *taeniata*, it seems necessary to drop the name for any one of these species.

Systema blanda Melsheimer. (Figs. 1 and 2.)

Systema blanda Melsheimer, Proc. Acad. Nat. Sci. Phila., vol. 3, p. 164, 1847.

Systema taeniata var. *blanda* Horn, Trans. Amer. Ent. Soc., vol. 16, pp. 273, 318, 1889.

¹ In Gemminger and Harold's *Catalogus Coleopterorum*, vol. 12, p. 3516, 1876, it is given as a synonym of *Phyllotreta vittata* Fabr.

² Le Conte, *Coleoptera of Kansas and Eastern New Mexico*, p. 26, 1859; regarded *taeniata* as synonymous with *H. elongata* Fabr., which he placed in the "division *Systema*" of *Haltica*.

Melsheimer described *Systema blanda* as testaceous, with the antennae and body beneath black, the elytra with reddish brown sutural vitta and lateral margins. The habitat was given as Pennsylvania.

In the Melsheimer collection at the Museum of Comparative Zoology at Cambridge are 10 specimens, following a series labeled "*blanda* Melsh. Pa. Ziegler," that are labeled "Pennsylvania, Melsheimer."³ These are all one species, although there is a slight variation in coloring. The punctation of the head is not dense but scattered and fine, the surface is very shining and pale reddish brown, the lower front paler yellow, and the labrum dark. The outer joints of the antennae are deep brown or piceous. The antennae do not extend to the middle of the elytra; the third joint is shorter than the fourth or fifth, which are subequal, the remaining joints slightly shorter. The prothorax has rounded sides and is slightly wider before the middle and contracted before the base. There is a faint depression on each side near the base; the surface is shining, finely and not densely punctate, and pale yellow with the lateral margin and often a little of the side brown or piceous. The scutellum is usually brownish. The elytra are shining pale yellow, more densely and regularly punctate than the prothorax, but not coarsely or deeply so. There is a reddish brown common sutural vitta uniting at the apex with a lateral marginal one, these vittae frequently being not much darker than the pale yellow of the elytra. The edge of the lateral margin is often deep piceous as far as the apical curve. The epipleura, prosternum, and legs are pale, but the metasternum and abdomen vary from reddish brown to piceous.

This is the only pale vittate *Systema* found east of the Mississippi River. The only other eastern vittate species, commonly known as *S. elongata* Fabr., is black with a yellowish white median elytral vitta.

Systema blanda is also found west of the Mississippi River. Specimens from Iowa, Missouri, and Kansas do not differ from specimens from New York to Georgia. In the Rocky Mountains, however, the species takes on a darker coloring. For instance, of 4 specimens from Burley, Idaho, the head in 2 is deep brown, the prothorax in 3 is irregularly darkened, the elytral vittae in all are piceous, and the epipleura, undersurface, and legs tend to be piceous. A similar deepening in coloration is found in specimens from Utah, Colorado, New Mexico, and Texas (Bosque Co.). Since

³ Hagen, H. A. (Can. Ent., vol. 16, p. 196, 1884) states that he "put on every pin a small printed label 'Melsheimer' to record the former proprietor."

other species of *Systema* closely resembling both the eastern pale form and the darker western form of *blanda* are found west of the Mississippi, the only certain method of identifying *blanda* from those regions is by examining the aedeagus.

Systema blanda belongs to a group represented north of the Mexican border by *blanda*, *blanda* subspecies *ligata*, and *mitis*. They are rather broadly oblong species, mostly pale, with distinctly punctate and vittate elytra and a less densely punctate prothorax, the lateral edges of both prothorax and elytra usually being dark. The antennae do not extend to the middle of the elytra, the prothorax is scarcely more than a third wider than long, with a basal impression at the sides, and the aedeagus is distinctive in having a lateral notch on each side near the apex. This peculiar notch occurs in one other group of species, to which *S. elongata* belongs, but the apex of the aedeagus in that group is not acute but broad.

None of the species of the *blanda* group exactly fits Say's description of *A. taeniata*. They all differ by having dense elytral punctation and less dense pronotal punctation, and all, except infrequent very dark forms of the California subspecies *ligata*, are pale as contrasted with the "deep black" of *taeniata*.

This species has been collected on the following plants: bean (Marshall Hall, Md.); corn (Columbia City, Ind.); cucumber (Madison, Wis.; Plymouth, Ind.); cotton (Atlanta, Ga.; Red Springs, N. C.); *Perilla* foliage (Madison, Wis.); pursley (Muscatine, Iowa); sugar beets (Bowling Green, Ohio; Fort Collins, Greeley, Rocky Ford, Colo.; Wellsville, Mendon, Utah; Burley, Idaho); *Salsola pestifer* (Taos, N. M.); turnip (Knox, Ind.); wheat (Cuckoo, Va.).

Specimens have been examined from: New York (Ithaca); New Jersey (Riverton, Troy Hills); Pennsylvania (Cove Mt., Frankford, Glen Olden, Lehigh Gap, Philadelphia, Terre Hill); Maryland (Beltsville, College Park, Glen Echo, Marshall Hall, Mt. Holly); Washington, D. C.; Virginia (Arlington, Cuckoo, Glencarlynn, Grassymead, Pennington Gap, Richmond, Smithfield); West Virginia (White Sulphur); North Carolina (Greensboro, Mitchell Co., Red Springs); South Carolina (Dean); Georgia (Atlanta); Mississippi (Jackson); Ohio (Belmore, Bowling Green); Kentucky; Indiana (Columbia City, Knox, Plymouth, Marion); Illinois (Algonquin, Antioch, Aurora, Carbondale, Dubois, Grand Tower, Marshall, Oakwood, Pulaski, Salts); Wisconsin (Madison); Iowa (Muscatine); Kansas (Mackenzie, Riley Co., Rooks Co., Topeka); Missouri; Texas (Bosque Co.); New Mexico (Barton, Estancia, Maxwell, Taos); Utah (Mendon,

Wellsville); Colorado (Colorado Springs, Denver, Fort Collins, Greeley, Pueblo, Rocky Ford); Idaho (Burley); Alberta (Medicine Hat).

Two specimens in the Bowditch collection from Surinam labeled in Jacoby's handwriting "*marginicollis* Cl." and "compared with type," both females, are indistinguishable from *blanda*.

Systema blanda subspecies *ligata* (Lec.). (Figs. 3 and 4.)

Haltica ligata Le Conte, Pacific Rail. Rept., p. 68, 1857.

Haltica ochracea Le Conte, Proc. Acad. Nat. Sci. Phila. (vol. 10), p. 87, 1858.

Systema taeniata var. *ligata* and var. *ochracea* Horn, Trans. Amer. Ent. Soc., vol. 16, pp. 273, 318, 1889.

Le Conte described *H. ligata* from one specimen, a female, collected at San José, Calif., which bears the Museum of Comparative Zoology Type No. 4458 and the label "*S. ligata* Lec., S. José." This specimen has a dark piceous, shining head, somewhat paler along the middle of the lower front, about the antennal bases, and around the eyes; the tubercles are well defined; the occiput and vertex have several coarse and numerous finer punctures and a fairly smooth impunctate area in the middle. Both antennae are missing. The prothorax is slightly wider before the middle and contracted near the base, with a slight depression on each side near the base, and is shining piceous with irregular paler reddish brown areas; the surface is not densely or coarsely punctate, but there are a few coarser punctures behind the middle. The elytra are shining and more regularly and densely but not very coarsely punctate. The sutural and lateral-marginal vittae are piceous and unite at the apex, the paler intervening vitta being clouded at the base with brown. The undersurface is dark, shining, and with scanty pubescence; one anterior and two middle femora and two posterior legs are present, the anterior and middle femora and posterior tibiae being paler and the posterior femora dark.

Haltica ochracea was described from a single specimen from San Diego, Calif., which bears the label "*H. ochracea* Lec., S. D." and the Museum of Comparative Zoology Type No. 4460. It is a somewhat misshapen specimen, possibly immature or twisted from being in alcohol, with the abdomen so shrivelled that the sex is not easily determinable. The prothorax, too, is not contracted near the base, as in typical specimens of *Systema* (probably deformed), the sides being widest at the base and narrowed anteriorly in nearly a straight line. The head is shining and deeper yellow than the prothorax, with a brown labrum and tubercles, and on each side of

the vertex are 6 or 7 coarse punctures. The antennal joints are of the same proportions as in *S. blanda*, with the first four basal joints paler than the outer ones. The prothorax is pale yellow, with the anterior lateral margin slightly edged with deeper brown, shining, rather irregularly punctate with a group of coarser punctures near the base, and with a short basal impression on each side. The elytra are shining pale yellow with barely visible traces of a sutural and a lateral marginal vitta joined at the apex; the punctuation is somewhat obsolete but dense. The metasternum and the abdomen are dark brown and the legs pale.

At first glance the very pale, somewhat distorted specimen from San Diego, with scarcely any sign of vittae, does not resemble the dark vittate specimen from San José, but a close comparison shows the two to be very similar in structure, and other specimens are found that present intergradations in color. A series of specimens from Sacramento, Calif., shows a wide color range from specimens even darker than typical *ligata* to some nearly as pale as typical *ochracea*. In several there are only traces of the pale elytral vittae, and one specimen from Chico has entirely dark elytra. Other specimens fully as pale as the type of *ochracea* occur in a large series from Huntington Beach, Calif., a series in which there are also dark specimens.

This Pacific coast *Systema* so closely resembles *Systema blanda* that it is unlikely that it is more than a subspecies of *blanda*. The aedeagus of the western specimens is very similar, the tip being only a little more pointed. Again the Pacific coast specimens are slightly larger and usually more deeply and coarsely punctate, the prothorax being usually but not always more densely punctate, and the coloring is often more variable in a single series from one locality than is found in the more eastern specimens from such widely separated points as Pennsylvania and Colorado. Differences of this sort occur in numerous species of Chrysomelidae that on the Pacific coast appear to take on a different habitus from their very close eastern relatives.

Specimens of this subspecies have been examined from the following California localities: Chico, Chino, Davis, Guerneville, Hamilton City, Huntington Beach, Irrigosa, Justin, Lindsay, Los Angeles, Oxnard, Pasadena, Pomona, Sacramento, Salton, San Bernardino, San Mateo, Santa Ana, Santa Clara, Spreckels, Van Nuys, Whittier.

It has been collected on sugar beet (Huntington Beach, Pasadena, Oxnard, Hamilton City, Spreckels, Chico, Chino); potato (Whittier); *Helianthus* sp. (Chino, Lindsay, Van Nuys); mus-

tard (Santa Ana); radish (Guerneville); and alfalfa (Sacramento).

Systema mitis (Lec.). (Figs. 6 and 7).

Haltica mitis Le Conte, Proc. Acad. Nat. Sci. Phila. (vol. 10), p. 87, 1858.

Systema taeniata var. *mitis* Horn, Trans. Amer. Ent. Soc., vol. 16, pp. 273, 318, 1889.

The specimen bearing the label "*H. mitis* Lec. Col." in the Le Conte collection, which also has the gilt label indicating the locality California and the Museum of Comparative Zoology Type No. 4459, is a somewhat immature specimen with the elytra a little curled under at the apex, the coloring not fully developed, and the abdomen so twisted that the sex is not determinable from that. This specimen may be regarded as the type, since the label "Col." evidently refers to Colorado River, Calif., the type locality. Following it is a second of the same species, also with a gilt label; a third, probably the same species, with no label; a fourth, not the same species, labeled "Cal.," with signs such as Crotch used; and a fifth, probably the same, with no label. It is unlikely that Le Conte had before him more than the first two specimens at most when describing *mitis*, since the rest do not bear labels corresponding to his type locality, and do not all agree with his description. In the type specimen, the head is reddish brown, a little paler on the lower front and on the extreme occiput, with a dark labrum, and with numerous coarse punctures on each side of the vertex. The antennae are entirely reddish brown and the third, fourth and fifth joints are about the same length. The prothorax is widest a little before the middle, the sides are rounded, and there is an indistinct transverse basal impression more apparent on the sides; the surface is very shiny with scattered coarse punctures, and paler yellow than the head, the lateral margins and a little of the sides being darker or piceous. The elytra are rather shallowly, not very coarsely and rather densely punctate, and have a reddish brown sutural and lateral marginal vitta united at the apex, with the apex a little paler. Beneath, the sides of the prosternum, mesosternum, and metasternum are dark, and the abdomen and legs pale.

As Le Conte states, *mitis* resembles *blanda* very closely. In general, it is larger and more slender than *blanda*, with a more coarsely punctate head, the antennal joints are entirely reddish brown instead of having darker outer joints, and the abdomen is usually pale, which is not true of *blanda*. The only certain method of distinguishing *mitis*, however, is by the aedeagus, which has a longer, more tapering tip than that of *blanda*. The aedeagi of two males

in a series from Amarillo, in northwestern Texas, appear to be intermediate in shape between those of *blanda* and *mitis*. From the standpoint of comparison of aedeagi, *blanda* and *blanda* subspecies *ligata* are more closely related to each other than either is to *mitis*, but all three are very similar in external appearance and by some will doubtless be regarded as merely geographic races of one somewhat variable widespread species.

Specimens of *mitis* have been collected at Yuma, Ariz., on alfalfa and at Amarillo, Tex., on sugar beet.

This species is represented in the National Museum collection from California (El Centro, Holtville, Salton); Arizona (Ft. Yuma); New Mexico (Las Vegas); Colorado (Rocky Ford); Texas (Amarillo).

***Systema mesochlora*, n. sp.**

(Fig. 8.)

Elongate-oblong, about 3.5 mm. long, shining, with very finely and sparsely punctate head and prothorax, and densely and distinctly punctate elytra; pale yellow or greenish yellow, the mouth parts, and usually the lateral margin of prothorax, and in dark specimens, the sutural and lateral-dorsal vitta, dark brown; in paler specimens only traces of elytral vittae; sides of prosternum, metasternum, and abdomen more or less dark.

Head smooth, shining, very finely and sparsely punctate; deeper yellow over occiput; mouth parts dark; frontal tubercles distinctly marked. Antennae long, slender, pale yellow, extending to middle of elytra, third joint usually a little shorter than fourth or fifth, which are subequal. Prothorax with rounded sides, wider before the middle, about a third wider than long, depressed more or less distinctly across base; surface shining, finely punctate; pale yellow or greenish yellow, with lateral margin and the lateral sides usually narrowly touched with brown. Scutellum rounded at base, yellow or brown. Elytra oblong with small humeral prominences, shining, densely and distinctly punctate; pale yellow or greenish yellow, in pale specimens frequently with little trace of vittae, in darker specimens with dark sutural and lateral-dorsal vittae, not joined at apex, sutural vitta not reaching apex and lateral vitta not near margin. Body beneath shining, lightly pubescent, sides of prosternum, metasternum, and often abdomen in part dark. Legs pale, frequently with outer edge of tibiae and apex of hind femora dark. Length 3.5 to 3.8 mm., width 1.5 to 1.6 mm.

Type male and 5 paratypes (3 males and 2 females) U. S. N. M. Cat. No. 50116, collected at San José, Costa Rica, by J. F. Tristán, in April, 1928.

Other locality.—San Isidro, Costa Rica.

This species has the usual rather broadly oblong shape, pale coloring, sparsely and finely punctate head and prothorax, and more densely punctate elytra characteristic of the *blanda* group. Likewise, the under surface is more or less dark. The aedeagus resembles those of the group in being pointed and having a lateral notching on the sides near the apex, but differs in minor details shown by the illustration. *S. mesochlora* is further distinguished by the elytral markings, which differ in that the vittae do not join at the apex, the lateral one is not near the margin, and the sutural one does not reach the apex. It is possible that the living beetles are distinctly green instead of yellow, as there is a greenish hue to some of the dried specimens.

Systema bitaeniata (Lec.). (Fig. 10.)

Halica bitaeniata Le Conte, Coleoptera of Kansas and Eastern New Mexico, p. 26, 1859.

Systema bitaeniata Horn, Trans. Amer. Ent. Soc., vol. 16, p. 318, 1889.

Le Conte described *H. bitaeniata* as elongate, piceous black, and above very shining (pernitida) with the head posteriorly paler, the thorax fuscous testaceous with three obscure spots, sparsely punctulate, with a light transverse basal impression, foveate in the middle; the elytra dark, punctate, with a wide pale dorsal and a marginal vitta, these vittae often uniting near the apex; the antennae and legs fuscous, the posterior femora obscure. The habitat is given as Santa Fé, N. Mex.

There is no specimen labeled *bitaeniata* in the Le Conte collection of *Systema*, but there are 3 unnamed specimens (1 male and 2 females) with a green-circle label, which indicates the Southwestern States, that correspond with Le Conte's description. The head is shining, with fine, not dense punctation, becoming a little coarser near the distinctly marked frontal tubercles. The color is somewhat variable, being brownish with a dark labrum and an indefinite dark area over the tubercles, a paler area across the vertex, and a dark spot behind the eye and in the middle of the occiput. The antennae are reddish brown, slender, not extending to the middle of the elytra, the fourth joint longer than the third. The prothorax is shining, rather sparsely and finely punctate, distinctly impressed across the base in the male and less so, with a median basal fovea, in the 2 females. The sides are rounded and wider before the middle. The prothorax is paler than the head, marked by three indefinite darker areas consisting of a median streak widened an-

teriorly and two lateral dark spots; in one of the females these spots and the median dark streak coalesce. The elytra are shining, not densely or coarsely punctate, with a dark sutural and lateral vitta not reaching the apex, the apex, margin and epipleura and median vitta on each elytron being pale. Beneath, the body is dark, the prosternum paler at the margin, and the legs yellowish brown except the darker hind femora. The male is about 4.5 mm. and the females 5 mm. long.

This dark vittate species is quite distinct from *blanda*, *blanda* subspecies *ligata*, or *mitis*. It is more highly polished, more lightly and not very densely punctate, with slightly longer and more slender antennae, with a differently shaped and wider prothorax, which is more or less darkly clouded, and with the edge of the elytral margin frequently and the epipleura nearly always pale. The aedeagus is entirely different from those of the *blanda* group. This species differs from Say's description of *Altica taeniata* in having finer punctation and a paler prothorax, and usually in having a pale elytral margin as well as pale epipleura.

There is considerable variation in the coloring of this species. Dark specimens occur in which the head is nearly all black, the prothorax dark except for a pale streak along the basal margin, and the elytra have only a narrow pale median vitta on each elytron. Even in the darkest specimens, however, the epipleura are nearly always pale. The palest specimens have a reddish brown head and prothorax in which there may be little trace of darker areas, and the elytra have a wide median pale vitta, which is joined at the apex to a narrower marginal pale vitta. The punctation, too, is often more distinct in some specimens than in others, but it is never coarse.

S. bitaeniata has been collected on "bracted bindweed" (*Convolvulus* sp.) in Alberta (F. S. Carr), and swept from locoweed in Arizona (E. E. Russell).

Specimens have been examined from Arizona (Ashfork, Flagstaff, Palmerly, Cochise Co., Petrified Forest, Prescott); Utah (City Creek Canyon, Ft. Douglas, Marysvale, Provo, Wasatch, Wellsville); Nevada; New Mexico (Las Vegas); Colorado (La Plata Co., Lookout Mt., Jefferson Co.); "Dakota"; Alberta (Medicine Hat); California (Bridgeport).

Systema pallidula Boh. (Fig. 5.)

Systema pallidula Boheman, Eugenes Resa, p. 192, 1858-9.

The habitat of *Systema pallidula* as given by Boheman is "St. Fransisco," Calif., and Insula Puna (an island off the coast of

Ecuador). Horn,⁴ with no discussion of the species, placed it under *S. taeniata* in his synonymy, and there it has remained ever since. A. Roman, of the Natural History Museum at Stockholm, in correspondence with the author, states that there are 10 specimens in the type material of *S. pallidula*, and has sent one as a gift to the National Museum. Mr. Roman has compared specimens sent him of all the pale species known from California, and writes that *S. pallidula* is different from any of them, and that the species may be a South American one, since "mistakes in labeling have not been rare in the 'Eugenia' material." He writes that the collection of *S. pallidula* consists of 6 specimens from "California" and 3 from Puna, but these are possibly a different species. The name *pallidula* was originally given by F. Sahlberg to one of his species from South Brazil, "of which we have one specimen, but this species being undescribed, Boheman took the name for his own species."

The cotype sent, a female, differs from any of the species from western North America examined by the writer by having a narrower head with narrower interocular space, and by having the elytra considerably wider than the prothorax. In coloring, too, the whole insect is pale, the head being a trifle deeper yellow over the occiput, and the elytra differ from those of the western species by lacking any trace of vittation. The frontal tubercles are rather indistinctly marked and the punctation of the head is extremely fine and sparse. The antennae are slender and more than half the length of the body, with the third joint a little shorter than the fourth, fifth or sixth, which are long and subequal. The prothorax is not quite twice as wide as long and wider before the middle, with a distinct basal impression, and is finely and densely punctate. The elytra have feeble humeral prominences, are considerably wider than the prothorax, and finely and moderately densely punctate.

A single specimen, also a female, in the National Museum collection, from Corozal, Canal Zone, Panamá, is very similar to the cotype of *pallidula* and probably represents the same species. Since the Frigate Eugenia stopped for 2 weeks in the Bay of Panamá and at the Island of San José (one of the Perlas Islands near Panamá), it seems reasonable to suppose that the type locality of *S. pallidula* (as represented by the specimen sent) may be Panamá rather than either Puna Island, off the coast of Ecuador, or San Francisco, Calif.

The description of *A. taeniata*, a polished black beetle with a

⁴ Horn, Trans. Amer. Ent. Soc., vol. 16, p. 318, 1889.

single white vitta on each elytron, does not fit either in regard to color or sculpture this pale, very finely punctured species.

***Systema laevis*, n. sp. (Fig. 9).**

Elongate-oblong, slender, about 3.5 mm. long, shining, very finely and indistinctly punctate, pale yellow with slightly deeper yellow head and antennae and sometimes a reddish-brown narrow sutural vitta not reaching apex, rarely a trace of a lateral vitta; elytra especially in male not much wider than prothorax.

Head smoothly rounded over occiput and very finely punctate, deep yellow with lower front paler and mouth parts often edged with brown; frontal tubercles rather indistinctly marked. Antennae about half length of body, pale, third joint usually a little shorter than but occasionally subequal to fourth, fifth or sixth, which are subequal, with the fourth slightly longer. Prothorax approximately one and a half times as broad as long, with sides only slightly curved as seen from above and widest before the middle; depressed at sides of base but not distinctly so across base; surface shining and finely punctate; usually entirely pale but in dark specimens with traces of three poorly defined spots. Scutellum rounded. Elytra not much wider than prothorax, with feeble humeral prominences, very smooth, shining, and finely punctate; in pale specimens often no trace of vittation, in darker specimens a narrow reddish-brown sutural vitta usually not extending to apex and wider in the middle, rarely a trace of a lateral vitta. Under surface and legs usually pale, but in darker specimens the metasternum and abdomen may be reddish brown. Length 3 to 3.8 mm., width 1 to 1.5 mm.

Type male and 4 paratypes (1 male and 3 females), U. S. N. M. Cat. No. 50117, collected by F. S. Nunenmacher, in Esmeralda Co., Nevada, 7 June, 1907.

Other localities.—California (Geysers, Los Angeles, Pasadena, Riverside, San Diego, Santa Monica); Arizona (Clemenceau, Gila River Valley, Glendale, Globe, Tucson, Winslow); Utah (Leeds, Salt Lake); Nevada (Esmeralda Co., Reno); Colorado (Durango, Paonia, Pueblo).

This species in its pale form frequently has no trace of elytral vittae. Since *S. pallidula* Boh. is also an entirely pale species with the habitat given by Boheman as San Francisco, Calif., and Puna Island (both probably erroneously), *S. laevis*, the only entirely pale species that does occur in California, has been identified in some collections as *S. pallidula*. It differs from that species in having a

wider head with wider interocular space and in having the elytra not greatly wider than the prothorax. The elytra in *pallidula* are conspicuously wider than the prothorax. It is distinguished from *S. blanda*, *mitis*, and *bitaeniata* by being more finely punctate. It is one of the palest and smoothest of North American species of *Systema*, rarely having a trace of a lateral elytral vitta. It differs from the pale but more coarsely punctate eastern species, *S. marginalis* Illig., by having smooth polished elytra. As is also true of *S. pallidula*, Say's description of *A. taeniata* can in no way be applied to this pale, finely punctate species. *S. semivittata* Jac., described from Guanajuato, Mexico, a cotype of which is in the Bowditch collection, differs from this species by having a narrower interocular space, more pronounced frontal tubercles, a more densely punctate vertex with a distinct median vertical line extending up from between the tubercles, and a narrower prothorax.

Systema laevis has been collected on sugar beet at Pasadena, Calif.

***Systema californica*, n. sp. (Fig. 12).**

Elongate-oblong, slender, about 4 mm. long, polished, head and prothorax finely and not densely punctate, elytra more distinctly and densely punctate; black, antennae varying from yellowish brown to deep reddish brown, a pale median elytral vitta; tarsi and sometimes apex of femora and often head in part reddish brown.

Head rounded over occiput, tubercles not very distinctly marked, surface polished, finely punctate on front and in middle of occiput; deep piceous, often with two reddish brown areas on occiput and a paler streak below eyes. Antennae long and slender, extending nearly to middle of elytra. Third joint usually shorter than fourth, varying from a little more than half as long to being subequal; fifth, sixth and seventh joints nearly as long as fourth or subequal to it; varying in color from yellowish to reddish brown, basal joint dark and apex of each joint darker than base. Prothorax not twice as wide as long, widest a little before the middle, with rounded sides, not depressed at base, very polished and finely and not densely punctate, frequently more densely so at base, in some specimens punctation more distinct; usually entirely black, but sometimes a deep reddish margin along base. Elytra narrowly oblong, without humeral prominence, rather distinctly and densely punctate; black with a pale median vitta, this slightly wider at base. Body beneath black, apex of femora and tarsi sometimes paler. Length 3.8 to 4.4 mm., width 1.5 to 1.8 mm.

Type male and 3 paratypes (1 male and 2 females) U. S. N. M. Cat. No. 50118.

Type locality.—"California."

Four specimens of this species, bearing only the locality label "Cal." and the label "Belfrage collection," are in the National Museum collection. Other specimens, not of similar mounting but with the same locality label, are in the Bowditch collection at the Museum of Comparative Zoology, and another, a male, in the Le Conte collection labeled "Cala." with the letter F, is determined as *S. taeniata* by Horn. H. C. Fall writes me that the letter F indicates that it was collected by Crotch at Santa Barbara, Calif. Mr. Fall has in his own collection three specimens of this species, which he had recognized as new, collected by him in June in the foothills of the Sierra Madre about 5 miles north of Pomona, California. He writes that they are similar to the Le Conte specimen in being extremely finely and sparsely punctate on the head and prothorax. Still another specimen, also labeled "Cal.," is in the collection of the Illinois State Natural History Survey.

This species is easily confused with *S. bitaeniata* (Lec.), but is darker and lacks the pale elytral margin usually found in *bitaeniata*. The prothorax is not so wide, the elytral punctation is more distinct, although not coarse, and the shape of the aedeagus is quite different. It differs from Say's description of *A. taeniata* in the punctation of the elytra, which are much more densely and distinctly punctate than the prothorax, and also in the color of the legs, but otherwise it corresponds more closely with Say's description than does any other of this group examined by the writer.

***Systema carri*, n. sp. (Fig. 11).**

Elongate-oblong, about 4 mm. long, moderately shining, head and prothorax finely and rather densely punctate, elytra usually more distinctly punctate. In pale specimens head and antennae reddish yellow, prothorax paler yellowish brown with darker clouding, elytra black with a median pale vitta wider at base and apex, margin and epipleura pale, body beneath piceous with paler brown legs; in dark specimens entire insect dark piceous except the reddish-brown antennae and tarsal joints and sometimes a paler reddish-brown margin around the pronotum.

Head rounded over occiput, dark reddish yellow or piceous with labrum always dark; finely and not densely punctate; tubercles rather indistinct. Antennae reddish or brown, not extending to middle of elytra, third joint usually very little shorter than fourth or fifth, which are subequal with the

fourth usually slightly longer. Prothorax not twice as wide as long, but wider proportionately than in the *S. blanda* or *elongata* groups; sides somewhat rounded, widest a little before the middle, a slightly depressed fovea in middle of base and one on each side, in some specimens these foveae very indistinct; surface distinctly but finely and moderately densely punctate; in pale specimens color yellowish or reddish brown, paler than head, usually with poorly defined darker brown areas irregularly clouding it; in dark specimens piceous, often with anterior and basal margins narrowly reddish brown. Elytra oblong with feeble humeral prominences, usually more coarsely punctate than prothorax; in pale specimens epipleura, lateral margins, and apex pale, and a pale median vitta widening at base and connecting with pale lateral margin over humerus; in dark specimens elytra entirely piceous or with only indistinct traces of paler median elytral vittae. Body beneath lightly pubescent, piceous, in pale specimens legs reddish or yellowish brown with the posterior femora dark; in dark specimens legs nearly piceous with the tarsi deep reddish brown. Length 3.8 to 4.5 mm., width 1.8 mm.

Type male and 1 paratype (female), U. S. N. M. Cat. No. 50119, collected by F. S. Carr, at Ft. Saskatchewan, Alberta, 10 July, 1922.

Other localities.—Alberta (Edmonton, Cypress Hills).

Systema carri in its entirely dark form might possibly be confused with *S. hudsonias* Forst., but *S. hudsonias* is more slender with a narrower prothorax and with less arcuate sides, and has varicolored antennae. In its vittate form, *carri* closely resembles *S. bitaeniata* (Lec.) and *S. dimorpha* Blake.⁵ All three are dark vittate species with a wide prothorax, and in pale forms all have pale elytral margins. *S. carri* may be distinguished from *S. bitaeniata* by its less polished and more coarsely punctate surface, particularly of the elytra, and by the differently shaped aedeagus. It is distinguished from *S. dimorpha* by having a less coarsely punctate head, and by not having a row of coarse punctures along the inner margin of the eye and over the frontal tubercles, which are prominent in *S. dimorpha*. There is no difference in coloration in the sexes as in that species, and the aedeagus is quite different. *S. carri* appears to be the most northern of the three species, having been found only in the mountains of the Cypress Hills range, at about 4000 ft. altitude, and in the vicinity of Edmonton, Alberta. Mr. Carr, to whom the species is dedicated, collected it at Edmonton

⁵ Blake, Proc. Ent. Soc. Wash., vol. 35, p. 181, 1933.

on spreading dogbane (*Apocynum* sp.) It differs from Say's description of *A. taeniata* by being paler in its vittate form and by having more densely punctate elytra.

GROUP 2.

Systema elongata (Fabr.). (Figs. 13, 14, and 15.)

Galleruca elongata Fabr., Ent. Syst. Suppl., p. 99, 1798; Syst. Eleuth., p. 500, 1801.

Altica elongata Oliv., Ent., vol. 6, p. 694, 1807.

Systema elongata Gemminger and Harold, Catalogue, 1876; Crotch, Proc. Acad. Nat. Sci. Phila., p. 69, 1879; Horn, Trans. Amer. Ent. Soc., vol. 16, p. 272, 1889.

Haltica subaenea Le Conte, Pacific Railway Rept., p. 68, 1857.

In addition to the citations given above, the synonymy of *Systema elongata* has been more or less interwoven with that of *Phyllotreta vittata*, making the entire history extremely complicated. From his brief description of *Galleruca elongata*, there is room for considerable doubt whether Fabricius was describing a *Phyllotreta* or a *Systema*. The description, translated, runs thus: "Aeneous black with a whitish vitta on the elytra. Habitat North America, Smith Barton. Small, but longer than the others. Antennae missing. Head and thorax aeneous black, immaculate. Elytra smooth with a wide whitish median vitta. Body aeneous black, femora strongly incrassate." There is no mention of the pale legs or the distinctly punctate upper surface, and the elytra are described as "laevia." Otherwise the description may be applied to the species that is today commonly known as *S. elongata*, and until a Fabrician type can be examined the writer has no desire to change the name.

The species commonly known as *Systema elongata* is widespread over the United States, and there is little difference between specimens found in Florida, Texas, New York, and Manitoba. As in *S. blanda*, however, specimens from the Rocky Mountains and the Pacific coast do present differences in markings. A series of 4 from Lehi, Utah, has the prothorax deep reddish brown with a paler basal margin instead of entirely black. This paler prothorax is also found in 5 of 6 specimens from Washington. In California the color is even more variable. In a series of 4 females from Sacramento, 2 are like the eastern specimens, 1 is slightly paler along the basal margin of the prothorax, with the vittae represented only by two spots at the base of the elytra, and 1 is entirely dark except for the antennae and legs, the posterior femora of which are dusky. A similar variation in color is shown in another series labeled sim-

ply "California." A large series in the collection of the Illinois State Natural History Survey, from Huntington Beach, Calif., cannot be distinguished in any way from the eastern specimens.

Le Conte described *Haltica subaenea* from a single entirely dark female from San José, Calif. (Museum of Comparative Zoology Type No. 4457). There is a second specimen in his collection, of which he made no mention at the time of his description, also bearing a gilt label indicating the locality California. It is likewise a dark female, and although with no trace of elytral vittae, it has a little paler head and a barely distinguishable paler streak along the base of the prothorax. The aedeagi of the dark Pacific coast forms do not differ from those of the eastern vittate specimens, and the occurrence of both forms together in several series of specimens from the West indicates that this dark form is scarcely worthy of distinction in nomenclature.

Specimens of *Systema elongata* have been examined from the following localities: New York (Binghamton); Maryland (Breton Bay, Chesapeake Beach, Chapel Point, Cabin John, Bladensburg); Washington, D. C.; Virginia (Clarendon, Mt. Monroe, Ragged Point, Rosslyn); North Carolina (Wilmington); South Carolina (Calhoun, Holly Hill, Pregnall); Florida (Haw Creek, Haulover, Enterprise, P. Orange); Alabama (Alberta, Coleta, Marion, Selma); Mississippi (Hattiesburg, McCalla, Natchez, Pachuta, Port Gibson, Utica); Louisiana (Baton Rouge, Berwick, Avery Island, Lake Charles, Mound, Opelousas, New Orleans); Texas (Kirbyville, Trinity); Arkansas (Camden, Danville); Nebraska (Westpoint); Tennessee (Elmwood, Nashville); Illinois (Grand Tower, Pulaski); Minnesota (Duluth, Fergus Falls); South Dakota (Brookings, Volga); Utah (Lehi, Kaysville); Manitoba (Rosebank); Washington (Chehalis, Pullman); California (Fresno, Huntington Beach, Los Angeles, Sacramento, Siskiyou).

It has been collected on the following plants: alfalfa (Sacramento, Calif.); *Ambrosia* sp. (Avery Island, La.); beets (Norfolk, Va.); cotton (Marion, Ala.); potato (Bladensburg, Md.); radish (Baton Rouge, La.).

Systema basalis Jaquel. (Fig. 16.)

Systema basalis Jaquel., *Historia de la Isla de Cuba*, vol. 7, p. 129, 1856.

In the West Indies occurs a species, *S. basalis* Jaquel., closely related to *S. elongata* but differing from it mainly in having the sexes differently marked. The proportions, color, punctation, and aedeagus are very similar to *S. elongata*, and the male beetle is

practically indistinguishable from it. The female, however, instead of having an entire pale elytral vitta, has only a small basal pale spot, or at most a basal and an apical pale spot.

Systema thoracica Jac. (Fig. 17.)

Systema thoracica Jacoby, Biol. Central. Amer., vol. 6, pt. 1, p. 333, 1884.

Systema bohemani Jacoby, Biol. Central. Amer., vol. 6, pt. 1, p. 334, 1884.

In Mexico and Central America occurs a third species (the male described by Jacoby as *S. bohemani*, the female as *S. thoracica*), also closely related to *S. elongata* and *basalis* and, like *basalis*, showing sexual differences in coloration. In a previous publication⁶ I synonymized *S. thoracica* with *S. basalis*, but study of a larger series of specimens and comparison of the aedeagi have convinced me that this is a distinct though closely related species. It differs from *basalis* in that the aedeagus has a slightly more pronounced lobing near the tip, as can be seen from the illustration, and also in that the sexual difference in coloration is not exactly the same as in *basalis*. In *basalis* the elytral vitta is entire in the male but seen only as a basal and sometimes apical spot in the female. The coloring of both sexes is black or aeneous black. In the female of *thoracica*, the elytral vitta may be complete or represented only by a spot at the base, or lacking. In the male, the vitta may be entire or represented only by a basal spot. But the male of *thoracica* is pale reddish brown whereas the female is black. In the limited number of specimens at hand it appears that the entire elytral vitta is more frequently present in the male than in the female; in other words, the female tends not only to be darker in coloring but to lack the vitta, as in the West Indian species.

In the specimens at the National Museum, the only difference between a male and a female from La Ceiba, Honduras, is that the male is pale reddish brown and the female black, both having entire elytral pale vittae. In three specimens from Tuxtla, México (type locality of *bohemani*), one male is like that from La Ceiba, being pale reddish with an entire elytral pale vitta, one female, also vittate, is piceous but not quite so dark as the female from La Ceiba, and the second female is black with only a basal spot representing the elytral vitta. A pair from Ingenio, Guatemala, is colored like those from La Ceiba. In a pair from Cobán, Guat., both sexes have only a pale basal spot on the elytra, but the male is reddish

⁶ Blake, Bull. Brooklyn Ent. Soc., vol. 26, p. 80, 1931.

and the female darker. In a pair from Chinandega, Nicaragua, the elytral vitta is present in both sexes and the female is only a little darker than the male. One female from Colima, México, which I believe is of this species, is entirely dark.

In the Bowditch collection at Cambridge, Mass., under *bohemani* is a cotype of *S. bohemani*, a male, from Tuxtla, México, and another specimen, a male, from Vera Cruz, México, the latter collected by H. H. Smith. Both are pale reddish brown with entire elytral vittae. These are from Jacoby's collection. Following these is a series of 7 from Manatee, British Honduras, determined as *bohemani* by Bowditch. Of these 5 are males of the typical pale tan coloring and with entire pale yellow elytral vittae, and 2 are dark females, 1 with the elytra entirely dark except for a dot at the base of the elytra, and the other with an entire elytral vitta. Bowditch, disregarding the similarity of these dark females to Jacoby's *thoracica*, rightly regarded them all as one species.

A paratype of *S. thoracica* from Dueñas, Guata., the first locality mentioned by Jacoby, a female, is black with a very narrow pale elytral vitta; another paratype from Zapote, Guata., also a dark female, is similarly marked but with a wider pale vitta; a third paratype from San Gerónimo, Guata., and two from Orizaba, México, all females, are black with only a pale spot at the base of the elytra. There are 3 more dark females with entire pale elytral vittae, 2 of them from Vera Cruz, collected by H. H. Smith, and evidently of the same series as the single pale male labeled *bohemani*.

EXPLANATION OF PLATE III.

- Fig. 1. *S. blanda* Melsh., cotype (♀) in Melsheimer collection; aedeagus of specimen from Philadelphia, Pa.
- Fig. 2. *S. blanda* Melsh., dark variety, from Estancia, N. Mex.
- Fig. 3. *S. blanda* subsp. *ligata* (Lec.), type (♀) of *ligata* in Le Conte collection; aedeagus of specimen from Sacramento, Calif.
- Fig. 4. *S. blanda* subsp. *ligata* (Lec.), type (?♀) of *ochracea* in Le Conte collection; aedeagus of specimen from Huntington Beach, Calif.
- Fig. 5. *S. pallidula* Boh., cotype (♀) from Stockholm Museum.
- Fig. 6. *S. mitis* (Lec.), type (?♀) in Le Conte collection; aedeagus of specimen from Yuma, Ariz.
- Fig. 7. *S. mitis* (Lec.), variety from Amarillo, Texas.
- Fig. 8. *S. mesochlora* n. sp., San José, Costa Rica.

- Fig. 9. *S. laevis* n. sp., Esmeralda Co., Nev.
 Fig. 10. *S. bitaeniata* (Lec.), cotype (♂) in Le Conte collection; aedeagus of specimen from Arizona.
 Fig. 11. *S. carri* n. sp., Cypress Hills, Alberta.
 Fig. 12. *S. californica* n. sp., California.
 Fig. 13. *S. elongata* (Fabr.), Chapel Point, Md.
 Fig. 14. *S. elongata* (Fabr.), dark variety, type (♀) of *subaenea* in Le Conte collection; aedeagus of dark specimen from California.
 Fig. 15. *S. elongata* (Fabr.), vittate form from California.
 Fig. 16. *S. basalis* Jaquel., Bayamón, P. R.
 Fig. 17. *S. thoracica* Jac., ♂ and 2♀♀, Tuxtla, México.

Geotrupes ulkei Blanchard.—With ten years interval I had taken two specimens of this apparently rare beetle under rocks on Monte Sano, Madison Co., Ala. On a visit to the mountain last June our party set out to learn something more about this evasive species. Turning rocks brought no results. (And did we turn rocks? An old man coming down the mountain path saw us at work, stood stock still for a while and finally asked what we thought we were doing. When told we were hunting beetles he chuckled and said, "Well, I'll be damned; I have walked these mountains for years and this morning I couldn't think what was up for every doggone rock on the mountain was turned upside down. Them must be goldbugs you are hunting sure enough.") Giving up the rocks, which by the way yielded many fine Carabids, we turned to scratching leaves and finally Dr. Jones gave a yell—there was our *Geotrupes* close to a small cylindrical hole in the ground, in diameter the size of a lead pencil and about an inch and a half deep, with some leaf frass at the bottom. Looking for holes in the ground was the next order of business and brought fourteen specimens all similarly located under leaves on level ground at the side of mountain paths, never more than one specimen in a hole one and a half to two inches deep with leaf frass at the bottom, no larvae. In July, Dr. Jones again visited the mountain and this time besides several beetles also found three larvae, two in one hole and one in another. The food seems to be decomposing leaves. And so endeth another rare species.—H. P. LÖDING, Mobile, Ala.